


U.S. Patent Application Serial No. 09/807,183
Amendment dated January 5, 2004
Reply to OA of September 10, 2003

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:



Claim 1 (Currently Amended): A multi-directional input apparatus comprising

a set of upper and lower turning members supported in said case such that said turning members can turn into two intersecting directions and each having a long hole extending in a direction perpendicular to said turning direction;

an operating member passing through each of said long holes of said set of upper and lower turning members, said operating member turning each of said turning members when said operating member is operated in arbitrary direction therearound;

a returning mechanism for returning said operating member from a position when said operating member is operated in the arbitrary direction therearound to a neutral position; and

set of signal output means connected to ends of said set of upper and lower turning members for outputting signal corresponding to a turning angle of each of said turning members; wherein

said operating member is integrally provided at its lower portion with a turning shaft which is perpendicular to said operating member at right angles and/or a turning-type coming-out preventing portion comprising an upwardly swelling semi-spherical portion, and a recess into which said coming-out preventing portion is turnably fitted is provided in a lower surface of the lower turning members, wherein said returning mechanism comprises a spring compressed and

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accommodated in said cases, and a slider biased by said spring, wherein said slider resiliently abuts from below against a flat surface downwardly formed on a lower portion of said operating member and flat surfaces downwardly formed on opposite end shafts of said set of upper and lower turning members.

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Claim 2 (original): The multi-directional input apparatus according to claim 1, wherein said returning mechanism resiliently holds said operating member and/or said set of upper and lower turning members in the neutral position.


Claim 3 (Canceled):

Claim 4 (Canceled):

Claim 5 (original): The multi-directional input apparatus according to claim 1, wherein said case is provided at its bottom plate with a boss directing upward, the lower portion of said operating member is supported by said boss such that said operating member can be turned in an arbitrary direction thereareound.

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Claim 6 (original): The multi-directional input apparatus according to claim 5, wherein said boss is provided at its upper surface with a downwardly swelling semi-spherical recess, and said operating member is provided at its lower surface with a downwardly swelling semi-spherical projection which fits into said recess.




Claim 7 (original): The multi-directional input apparatus according to claim 5, wherein said boss is provided at its upper surface with an upwardly swelling semi-spherical projection, and said operating member is provided at its lower surface with an upwardly swelling semi-spherical recess into which said projection is fitted.

Claim 8 (original): The multi-directional input apparatus according to any one of claims 5 to 7, wherein said boss also serves as a guide for said slider.

Claim 9 (original): The multi-directional input apparatus according to claim 1, wherein said operating member is biased upward by said returning mechanism, and a push switch which is pushed down by said operating member is disposed below said operating member.

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Claim 10 (original): The multi-directional input apparatus according to claim 1, wherein an upwardly swelling substantially semi-circular turning shaft is disposed as a coming-out preventing portion below a shaft of said operating member.



Claim 11 (original): The multi-directional input apparatus according to claim 10, wherein an upwardly swelling substantially semi-circular disc is disposed below a shaft of said operating member, and a lower surface of said disc is a downward flat surface against which said slider abuts.

Claim 12 (original): The multi-directional input apparatus according to claim 11, wherein said lower turning member is provided at its lower surface with a recess into which said disc is tunably fitted, and a pair of bearings are provided on an inner surface of said recess as a recess into which said turning shaft is fitted.

Claim 13 (original): The multi-directional input apparatus according to claim 1, wherein said operating member is provided at its lower portion with a downward flat surface against which said slider abuts, and said operating member includes a pair of substantially columnar turning shafts as coming-out preventing portions projecting from opposite sides of said flat surface.

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Claim 14 (original): The multi-directional input apparatus according to claim 13, wherein
said lower turning member is provided at its lower surface with a pair of bearings as recesses into
which said pair of turning shaft are tunably fitted.

Claim 15 (original): The multi-directional input apparatus according to claim 1, wherein
said set of signal input means are any of electric sensors, optical sensors and magnetic sensors.
